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## VIDEO TAPE INDEXING SYSTEM AND METHOD

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### RELATED APPLICATION

This application claims priority of U.S. provisional Application No. 60/112,945 filed December 18, 1998, the disclosure of which is incorporated fully herein. This application is also related to application Serial No. 08/777,799, 10 filed on December 31, 1996, the disclosure of which is incorporated fully herein by reference.

### BACKGROUND OF THE INVENTION

One of the major cost items in the Index Plus<sup>+</sup> system is 15 the memory needed to store the information of the shows, which includes channel, date, time, length and title of a show. This practically requires as much memory as is needed for implementation of an electronic program guide (EPG). Also, the number of days in advance of the program telecast that recordings 20 can be scheduled is limited by memory and data bandwidth.

The invention greatly reduces the memory requirement and hence the cost of implementation. It is primarily intended to be implemented without a locally stored EPG data base.

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### SUMMARY OF THE INVENTION

The system includes an input that receives indications identifying a television program broadcast, including one or more of channel, start time, end time, date, day of the week and length. It also includes a video system recorder controller that 30 provides commands to one or more of a video recorder and a tuner to record a television program according to one of the input indications, an index memory that stores video tape identification and video tape index information and the identification indication for television programs recorded under 35 control of the video system recorder controller and a data

receiver that receives data comprising titles, sets of television  
broadcast identifiers, each such set including one or more of  
5 channel, start time, end time, date, day of the week and length,  
and associations between a plurality of the titles and a  
plurality of the sets of television broadcast identifiers. The  
title from the data receiver is stored in the index memory and  
associated with the video tape identification and video tape  
10 index information and the identification indication associated  
with the title.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a block diagram of a system according to a  
15 preferred embodiment of the invention.

#### **DETAILED DESCRIPTION**

The concept is first to accept as an input at a user  
terminal either through (a) VCR Plus+, (b) direct  
20 channel/date/time/length (CDTL) input, or (c) instant, i.e., real  
time, recording, the CDTL information of the show(s) the user  
wishes to record. In case (a), the Plus Codes are decoded to  
produce CDTL information. In case (c), the time that the record  
command is given is read from a real time clock and the channel  
25 to which the tuner is set is read at the time of the record  
command. (There is usually no length information in this case.)  
In cases (a) and (b), the CDTL information, is stored in an  
appropriate memory (either in a RAM in the VCR, on the tape, or  
on a chip attached to the tape cassette, etc.). In case (c),  
30 the channel and time of the record command are stored in the  
memory. In cases (a) and (b), the time component of the CDTL  
information is compared with the output of a real time clock;  
when a match occurs, the tuner is set to the channel represented  
by the CDTL information and the VCR is turned on to record the  
35 show the user has selected. In all cases, the location of the

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program being recorded on the tape is also stored in the memory with the channel and time information. In all cases, date may  
5     be replaced with day of the week and length may be replaced with end time or start time and length can be replaced with end time and length. If the recording is performed on the same day as it is programmed to be recorded even the date or day of the week can be omitted. Also, because recording automatically stops at the  
10    end of the tape, the length or end time is not critical to the system's operation either.

On a regular basis, e.g., once a day or every other day, all the program titles (and related data) for a specified time period are transmitted with the television signal, e.g., in the  
15    VBI. Alternatively, the data may be sent in a distributed way over a long period of time, e.g., 24 hours. In the latter case, the receiving equipment has to monitor the VBI data over the time of data broadcast (e.g., 24 hours). The channel and time of telecast of each program are included with the program title.  
20    The title of a program, and other related information such as the theme of the program, if desired, is selectively grabbed only at the users terminals that have already recorded or are scheduled to record that program. Specifically, the channels and times stored in memory at the user terminal are compared with the time  
25    and channel transmitted with each title. When a match occurs, the transmitted title is stored in memory. It may be used at the user terminal either together with the CDTL information or as a replacement for the channel and time stored therein. As a result, ultimately the title is stored with the location of each  
30    recorded program and other grabbed information in a tape directory in memory at the user terminals. When the user wishes to play a recorded program, the directory is displayed on the screen of a television monitor and the user marks the desired program with an on screen cursor. The VCR then transports the

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tape to the beginning of the desired program and the desired program is played.

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For example:

At time T1, the user inputs a PlusCode (or other form of CDTL information) indicating which program to record; the equipment generates and stores the CDTL information.

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At time T2, either before or after the recording of the desired program, a download session occurs in which all the program titles, channels, and times for a given time period are transmitted with the television signal to the users; the VCR of each user flags down only the titles (including other information such as theme related to the program) corresponding to the CDTL information stored at that user terminal, stores these titles in memory or replaces the corresponding CDTL information in the memory with the titles.

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After T2, the titles will be utilized by the user for display of directories and selection of recorded programs at that user terminal.

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The drawing illustrates a user terminal. A cable feed 10 or other television signal source such as an antenna or satellite dish is connected to a tuner 12, which is part of a cable box, television receiver, or satellite receiver. A switch 14a alternatively connects tuner 12 to a television monitor 16 for program viewing or to a VCR 18 for program recording. A switch 14b alternatively connects tuner 12 for viewing or VCR 18 for playback to monitor 16. Tuner 12, switch 14a, switch 14b, monitor 16, and VCR 18 are controlled by a microprocessor 20 having a memory 22 such as a RAM. Assuming analog transmission of the television signal, a VBI decoder 24 is connected between tuner 12 and switch 14a to extract program title information from the VBI of the television signal. (If the television signal is transmitted in digital form, no VBI decoder is needed.) This

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title information is coupled to microprocessor 20 for storage in memory 22. An input device 26 such as a remote controller is coupled to microprocessor 20 to enter user commands. As is well known, another tuner and appropriate switching could be provided to permit simultaneous television viewing and VCR recording. The Plus Codes, CDTL information, or instant recording command is entered into microprocessor 20 by input device 24. Microprocessor 20 stores the CDTL information, or channel and time, as the case may be, in memory 22 and, in cases (a) and (b), compares the time component with the output of the real time clock, which is internal to microprocessor 20. At the time of the program to be recorded, microprocessor 20 connects tuner 12 to VCR 18 through switch 14a, sets tuner 12 to the channel represented by the CDTL information in cases (a) and (b) or the selected channel in case (c), turns on VCR 18 for the duration of the program, and stores the tape location in memory 22 with the title or CDTL information, depending upon whether the title is grabbed before or after the recording. The title, channel, and time information for each time period, e.g., a 24-hour day, may be transmitted several times during the time period, and thus may arrive before or after the CDTL information or the instant record command is entered through input device 26. (In an alternative embodiment, the title, channel, and time information may be transmitted after the time period in which the programs are transmitted, and thus would always arrive after the CDTL information or the instant record command is entered through input device 26.) As the title, channel, and time information for each program is being transmitted in the television signal, it is extracted by VBI decoder 24. Microprocessor 20 compares the channel and time with the channel and time of the CDTL information stored in memory 22. If a match occurs, the title is grabbed and stored. The title is substituted for the CDTL information if the title is grabbed after recording. The title

is stored in addition to the CDTL information if the title is grabbed before recording and then the CDTL information is discarded after recording. Otherwise the transmitted title, channel, and time information is discarded. Alternatively, the CDTL information could be stored for later use and display in either case.

In summary, only the titles of the recorded programs or the programs to be recorded are selectively grabbed and stored, rather than all the programs telecast during a specified time period. In addition, only the CDTL information of the programs to be recorded is also stored. The result is a versatile tape management capability with a small storage requirement.

When the user wishes to play back a recorded program, VCR 18 is connected to monitor 16 through switch 14b. The user loads the corresponding tape cassette into VCR 18. Microprocessor 20 retrieves the program titles on the tape from memory 22 and feeds this information through VCR 18 to monitor 16 for display as a directory of the tape. When the user selects one of the titles from the on-screen directory, microprocessor 20 transports VCR 18 to the start of the selected program on the tape.

If the CDTL information is stored early enough, the transmitted program titles could be included in a conventional EPG data stream transmitted before the program is recorded and extracted therefrom for the described purpose. (Application Serial No. 08/728,614, filed on October 10, 1996 is incorporated by reference as if set forth in full herein for a description of how such a data stream is transmitted.) Otherwise, the titles are selectively grabbed from a customized data stream transmitted before and/or after the program is recorded.

In an alternative embodiment, the title information is received using a wireless receiver (not shown) such as a pager receiver.